CLAIMS

What is claimed is:

1. A method for manufacturing a magnetoresistive sensor comprising:

providing a substrate:

forming a photoresist mask over a desired sensor area

depositing a magnetic hard bias material;

removing said photoresist mask;

depositing a plurality of sensor layers as full film layers; and

chemical mechanical polishing sufficiently to remove portions of said sensor layers formed outside said sensor area.

2. A method as in claim 1 wherein said plurality of sensor layers includes a free layer, said method further comprising:

before forming said photoresist mask and before depositing said hard bias material, depositing a dielectric material of such a thickness that said hard bias material will align with said free layer.

3. A method as in claim 2 further comprising, after removing said photoresist mask, perfoming a material removal process to remove portions of said dielectric material not covered by said hard magnetic material.

4. A method as in claim 2 further comprising, after removing said photoresist mask, performing a reactive ion etch (RIE).

5. A method as in claim 2, wherein said dielectric material comprises SiO_2.

6. A method as in claim 1, wherein said substrate is a magnetic, electrically conductive material.

7. A method as in claim 1, further comprising, after depositing said hard magnetic material, depositing an electrically insulating material.

8. A method as in claim 1, further comprising, after removing said photoresist mask, depositing a dielectric material, and then performing a reactive ion etch to remove horizontally disposed portions of said dielectric material.

9. A method as in claim 8 wherein said dielectric material comprises SiO_2.

10. A method of manufacturing a current perpendicular to plane (CPP) magnetoresistive sensor, comprising:

forming a first electrode;

depositing a first full film layer of electrically insulating material onto said first electrode;

forming a photoresist mask over a desired sensor area;

depositing an electrically conductive seed layer;

electroplating a magnetic, high coercivity hard bias material onto said seed laeyr;

depositing a second electrically insulating layer;

removing said photoresist mask;

depositing SiO2, conformally to cover horizontal and non-horizontal surfaces;

perform a reactive ion etch (RIE).

depositing a plurality of full film sensor layers;

performing a chemical mechanical polishing (CMP) process; and

depositing a second electrode

11. A method of manufacturing a magnetoresistive sensor, comprising:

providing a substrate;

forming a photoresist mask in a sensor area, said mask having first and second laterally opposed sides;

depositing a magnetic material, at least a portion of said magnetic material defining first and second magnetic layers extending from said laterally opposed sides of said mask;

removing said photoresist mask to define a trench between said first and second magnetic layers; and

depositing sensor material layers, at least a portion of said sensor material layers being deposited in said trench.

12. A method as in claim 11 further comprising, after depositing said sensor material layers, performing a chemical mechanical polishing process to removed portions of said sensor material disposed outside of said trench.

13. A method as in claim 12 further comprising, after depositing said magnetic material, depositing a physically hard insulating material layer.

14. A method as in claim 13 wherein said physically hard insulating material layer is alumina (Al_2O_3).

15. A method as in claim 13 wherein said physically hard insulating material layer is diamond like carbon (DLC).

16. A method as in claim 13, wherein said physically hard insulating material layer is SiO_2.

17. A method for manufacturing a magnetoresistive sensor, comprising:

providing a first electrode having an upper surface;

depositing a layer first layer of SiO_2 onto said upper surface of said electrode;

forming a photoresist mask on said first layer of SiO_2;

depositing an electrically conductive seed layer;

depositing a high coercivity magnetic material onto said seed layer;

depositing a physically hard insulating material;

depositing a second layer of SiO2;

performing a reactive ion etch process;

depositing sensor material layers;

perform a chemical mechanical polishing process; and

depositing an electrically conductive material to form a second electrode.

18. A magnetic head comprising:

a first electrode;

a magnetoresistive sensor having first and second laterally opposed sides

a and formed upon said first electrode'

first and second electrically insulating walls formed at said first and second sides of said sensor;

first and magnetic hard bias layers extending laterally outward from said first and second walls;

first and second physically hard electrically insulating layers formed over said first and second hard bias layers; and

a second electrode formed over said sensor and said physically hard electrically insulating layers.

19. A magnetic head as in claim 18, wherein said physically hard electrically insulating layers comprise alumina (Al_2O_3).

20. A magnetic data memory system, comprising:

magnetic disk;

a motor connected with said disk rotating said disk;

a slider;

an actuator connected with said slider to position said slider adjacent said disk;

a magnetic sensor connected with said slider, said sensor comprising:

a first electrode;

a magnetoresistive sensor having first and second laterally opposed sides a and formed upon said first electrode'

first and second electrically insulating walls formed at said first and second sides of said sensor;

first and magnetic hard bias layers extending laterally outward from said first and second walls;

first and second physically hard electrically insulating layers formed over said first and second hard bias layers; and

a second electrode formed over said sensor and said physically hard electrically insulating layers.